



# GEORGIA ROADS

**“BETTER ROADS THROUGH COOPERATION”**

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**A Newsletter  
of Georgia's  
Local  
Technical  
Assistance  
Program  
(LTAP)**

## The Science of Highway Safety

**Highway Safety Manual is a valuable tool for local agencies**

*By John Rynanen, Editor*

*Center for Technology & Training, Michigan Tech Transportation Institute*

As a civil engineer (or one who works closely with civil engineers) you know that when you're designing an intersection and you have a question about sight distance, you can look in the American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets, also known as the AASHTO Green Book, for an answer. Similarly, when you have a question about signs, pavement markings and signals for the same intersection, you know you will find all the answers in your copy of the Manual on Uniform Traffic Control Devices, or MUTCD.

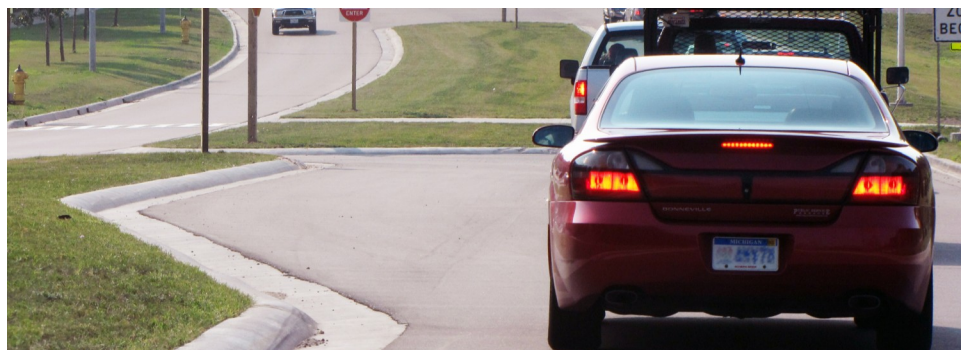
*“Dedicated turn lanes, pedestrian refuge areas, adequate signage, and wide separation between traffic lanes all contribute to the safety of a road. The new Highway Safety Manual provides guidance for determining the best treatments to address safety concerns.”*

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But where do you look when you have a question about traffic safety? For example, what is the safest method for handling left-turn movements at a four-way signalized intersection? Until recently, you would have had to sift through multiple sources of information (including, probably, the AASHTO Green Book, the MUTCD, and published research reports) to find an answer to such a question. But there was no guarantee that you would find a definitive answer. The question about left-turn movements exposes a dilemma that safety professionals have grappled with for years: What constitutes safety on a road? Must a road simply adhere to established design standards to be considered safe, or does it require something more?

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The Local Technical Assistance Program (LTAP) is a nationwide effort financed jointly by the Federal Highway Administration (FHWA) and individual state departments of transportation and/or universities. The program's purpose is to disseminate the latest state-of-the-art technologies for roads, highways and bridges to municipal and county highway and transportation personnel.

The Georgia LTAP is supported by FHWA and the Georgia Department of Transportation. Publishing the Georgia Roads Newsletter is one of LTAP's responsibilities. The opinions, findings or recommendations expressed in this newsletter are those of the Georgia LTAP Center and do not necessarily reflect the views of FHWA or the Georgia Department of Transportation.

The Georgia Roads Newsletter is distributed free of charge to counties, cities, towns and other transportation partners.



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[www.dot.ga.gov/doingbusiness/trainingresources/Documents/LTAP/Videocatrev1119.pdf](http://www.dot.ga.gov/doingbusiness/trainingresources/Documents/LTAP/Videocatrev1119.pdf)



## Letter from the Director

Hello everyone...I would like to thank everyone that took the time to complete the Needs Assessment Survey online. I hope that we can take some of the recommendations and comments and use them to develop even better training opportunities for you in the future.

I would like to encourage everyone to occasionally visit our website for updated training opportunities and to register on-line for any class that may be of interest.

In the future, we are looking into offering some of our classes by video-conference to all of the GDOT District Offices, this option will give more city and county agencies an opportunity to attend the training by reducing the travel time and expense. This is something that I hope in the future can grow and will prove to be very beneficial. When the time comes, please give this training option a chance and send me any comments on what you think of the set-up or how we may improve the process.

Best wishes,  
Christy

## EVENT CALENDAR

### DATE

### LOCATION

#### **Chain Saw Safety**

August 19

Moultrie, GA

September 7

Jesup, GA

#### **Safety 365– A Safety Workshop for Local Governments**

August 17

Jesup, GA

August 24

Cartersville

September 7

Atlanta (West Annex)

#### **Improving Safety of Horizontal Curves**

September 9

Atlanta (West Annex)/ V/C -DOT Dist Offices

- For those of you who can't travel to Atlanta, this course will also be broadcast to all GDOT District Offices through Video Conference.

#### **Culvert Design, Installation and Maintenance**

September 12

Jesup, GA

September 13

Macon, GA

September 14

Atlanta, GA (West Annex)

September 15

Gainesville



***Mark your  
Calendar !***

For up-to-date training opportunities, checkout our website at [www.dot.ga.gov/localgovernment/ltap](http://www.dot.ga.gov/localgovernment/ltap)

Most classes are free for local government representatives. To register for a class, please go to our website.

You can also email us at [ltap@dot.ga.gov](mailto:ltap@dot.ga.gov) or call 1-800-573-6445.

# Safety Effectiveness of the HAWK Pedestrian Crossing Treatment

Do, Ann (Winter/Spring 2011), Safety Effectiveness of the HAWK Pedestrian Crossing Treatment. *Publication of the Federal Highway Administration Safety Program*, 5 (1), 5

In the late 1990s, Tucson, AZ, developed the High intensity Activated crosswalk (HAWK), a beacon to assist pedestrians in crossing major arterials. Early evaluation seemed very promising, indicating driver yield percentages greater than 95 percent, even on major streets with multiple lanes or higher speeds. A decade later with few pedestrian crossing treatments having high yield rates on major arterials, FHWA sponsored a study to objectively evaluate the HAWK's safety effectiveness. This study confirmed the earlier indications of the effectiveness of the HAWK. The HAWK is a pedestrian-activated beacon located on the roadside and mounted

on mast arms at intersections (see photo below). The HAWK head consists of two red lenses over a single yellow lens. The HAWK beacon is dark until it is activated by a pedestrian. Activation triggers the warning flashing yellow lens on the major street. After a set time, the indication changes to a solid yellow light to inform drivers to prepare to stop. The beacon then displays a dual solid red light to drivers on the major street and a walking person symbol to pedestrians. At the conclusion of the walk phase, the beacon displays an alternating flashing red light, and pedestrians are shown an upraised hand symbol with a countdown display informing them of the time left to cross. During the alternating flashing red lights, drivers can proceed after coming to a full stop and checking that pedestrians have already crossed their lane of travel. Each successive driver is legally required to come to a full stop before proceeding during the alternating flashing red phase.

The alternating flashing red phase allows the delay to traffic to match the actual crossing needs of the pedestrians. Drivers can proceed with a stop-and-go operation during the flashing red phase. If pedestrians need more time, then the drivers remain stopped until they finish crossing. The ability to balance the pedestrian needs with driver delay is a valuable com-

ponent of the HAWK treatment.

The study applied a before-after Empirical Bayes method which combined actual crash data before and after the installation of the HAWK beacon with what is known about crash frequencies under other similar circumstances. This is a well-proven way to estimate changes in safety resulting from the application of a safety countermeasure. The study found that after the installation of a HAWK unit:

- There was a 29 percent reduction in total crashes.
- There was a 69 percent reduction in pedestrian crashes.
- There was a 15 percent reduction in severe crashes.



The HAWK pedestrian crossing beacon is a useful tool for improving pedestrian safety under appropriate conditions. Just like any other warning traffic control device, it may not work as effectively if it is overused. In addition, the high crash reductions identified in this study may not be achieved at other locations if the site has different characteristics, such as reduced pedestrian activity.

For more information, contact Ann Do, 202-493-3319, [ann.do@dot.gov](mailto:ann.do@dot.gov) or view the report <http://www.fhwa.dot.gov/publications/research/safetdoy/10045/index.cfm>). ■



# Experiment with Power Grid May Throw off Your Electric Clock



*Below is an article on a Power Grid Experiment set to start this Summer that may interfere with traffic control equipment. The Federal Energy Regulatory Commission is considering an experimental relaxation of regular corrections to the power grid's frequency variation. Mid-July is the tentative date that a year-long test is scheduled to begin. The most significant transportation-related impact of this test could be to traffic signal control equipment which relies on the power grid's frequency for timing purposes. It is not anticipated this test will cause hardware damage, but there may be minor effects on signal phase timing and coordination, and noticeable effects over time on the implementation of timing plan changes. These issues may require that traffic signal operational adjustments be made by State and local transportation agencies, and could be particularly noticeable in traffic signal systems that use a mix of equipment with timing based on the power grid and those using GPS or other time keeping mechanisms.*

**By Associated Press. "Experiment with Power Grid May Throw off Your Electric Clock." 24 June 2011.**

A yearlong experiment with the nation's electric grid could mess up traffic lights, security systems and some computers — and make plug-in clocks and appliances like programmable coffeemakers run up to 20 minutes fast.

"A lot of people are going to have things break and they're not going to know why," said Demetrios Matsakis, head of the time service department at the U.S. Naval Observatory, one of two official timekeeping agencies in the federal government.

the rate of the electrical current that powers them. If the current slips off its usual rate, clocks run a little fast or slow. Power companies now take steps to correct it and keep the frequency of the current — and the time — as precise as possible.

The group that oversees the U.S. power grid is proposing an experiment that would allow more frequency variation than it does now without corrections, according to a company presentation obtained by The Associated Press.

Officials say they want to try this to make the power supply more reliable, save money and reduce what may be needless efforts. The test is tentatively set to start in mid-July, but that could change.

***"A lot of people are going to have things break and they're not going to know why"***

Tweaking the power grid's frequency is expensive and takes a lot of effort, said Joe McClelland, head of electric reliability for the Federal Energy Regulatory Commission.

Tweaking the power grid's frequency is expensive and takes a lot of effort, said Joe McClelland, head of electric reliability for the Federal Energy Regulatory Commission.

"Is anyone using the grid to keep track of time?" McClelland said. "Let's see if anyone complains if we eliminate it."

(continued on page 9)

Since 1930, electric clocks have kept time based on

# Summer Safety

Written By: Beverly Fontenot, Staff Development/Training Coordinator



Summer is here and the heat is on, everyone should take precautions against heat related incidents. So many simple measures can be taken to significantly reduce the chance of getting heat exhaustion and heat stroke. Experts encourage

drinking plenty of water and taking frequent breaks while working outside. Staying inside and avoiding strenuous activity is also recommended.

According to the Centers for Disease Control and Prevention, approximately 400 Americans die each year due to summer's sweltering heat. Furthermore, the National Weather Service asserts that excessive heat was the number one weather-related killer, causing more fatalities per year than floods, lightning, tornadoes, hurricanes, winter storms and extreme cold from 2003-2008.

Everyone is at risk when temperatures rise above 90 degrees but the elderly and the very young are most susceptible to heat and heat-related illnesses. Heat-related illnesses can cause serious injury and even death if unattended. Signs of heat-related illnesses include nausea, dizziness, flushed or pale skin, heavy sweating and headaches. Victims of heat-related illness should be moved to a cool place, given cool water to drink and ice packs or cool wet cloths should be applied to the skin. If a victim refuses water, vomits or loses consciousness, call 911 or your local emergency number immediately.

## Heat Safety Tips:

- **Dress for the heat.** Wear loose-fitting, lightweight, light-colored clothing. Light colors will reflect away some of the sun's energy. It is also a good idea to wear hats or to use an umbrella.
- **Drink water.** Carry water or juice with you and drink continuously even if you do not feel thirsty. Avoid alcohol and caffeine, which dehydrate the body. Avoid using salt tablets unless directed to do

so by a physician.

- **Eat small meals and eat more often.** Avoid high-protein foods, which increase metabolic heat.
- **Slow down. Avoid strenuous activity.** Athletes and those who work outdoors should take short breaks when feeling fatigued. Schedule physical activity during the morning usually between 4 and 7 a.m. or evening when it is cooler.
- **Stay indoors when possible.** If air-conditioning is not available, stay on the lowest floor out of the sunshine. Remember that electric fans do not cool, they simply circulate the air.
- **Be a good neighbor.** During heat waves, check in on elderly residents in your neighborhood and those who do not have air conditioning.

*....Approximately  
400 Americans  
die each year due  
to summer's  
sweltering heat.*

NEVER leave pets or young children in a car, even with the windows cracked;

## Know What These Heat-Related Terms Mean and What to Do:

**Heat cramps:** Heat cramps are muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are an early signal that the body is having trouble with the heat.

**Heat exhaustion:** Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim may suffer heat stroke. Signals of heat exhaustion include cool, moist, pale flushed or red skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. ■

# Citizens needed in Anti-Litter Effort

*Written by: Michael Darbouze in GDOT Communications*

Fast food wrappers, cigarette butts, and aluminum cans are the most common types of litter found on the roadside. It can take up to eight months, five years and 500 years respectively, for these unwelcomed roadside regulars to decompose.

The Georgia Department of Transportation (GDOT) spends nearly \$14 million a year in an effort to see the strewn objects removed from Georgia's roadsides. The General Assembly passed 11 litter control laws to bring the negligent behavior to an end. Individuals caught in the act of littering could be fined \$1,000 and be made to pick up litter.

The high cost state and local agencies pay out to clear debris and the current penalties in place aren't enough to eradicate the litter problem. GDOT and Keep Georgia Beautiful have partnered to provide a way for citizens to get involved in anti litter efforts.

The Adopt-A-Highway Program promotes civic responsibility and pride. There are two ways participants can show they care about their community. Groups can adopt at least a one-mile stretch of highway and remove litter from both sides of the road a minimum of four times a year for two years. Members can adopt a highway by paying for a litter removal service to clean a two-mile stretch of highway for a two year period.

Anyone can get involved in this cleanup initiative by assembling a group of nine members and contacting GDOT. The program offers a way to acknowledge the selfless and often time thankless work of volunteers. GDOT posts two recognition signs so that motorists can see who is responsible for the clean roadways.

Eliminating the filthy footprint left by litter will require the involvement of every individual. There are five things that people can do in order to help keep

Georgia beautiful:

- Use lids to cover your trash cans.
- Pick up one piece of litter every day.
- Pick up every piece of litter in front of your house once a week.
- Carry a bag for trash in your car.
- Don't litter.

Waiting a million years for a glass bottle to break down is detrimental to the environment and costly to citizens. If everyone does a little to help bring an end to litter, the impact would go a long way to make the environment safer and the economy stronger. ■



## **Standards not enough**

Dr. Ezra Hauer, Professor Emeritus in the Department of Civil Engineering at the University of Toronto and internationally-recognized highway safety expert, introduced the adjectives “nominal” and “substantive” to help shed more light on the topic of roadway safety. In a 1999 paper titled *Safety in Geometric Design Standards*, Hauer wrote, “Nominal safety is judged by compliance with standards, warrants, policies and sanctioned procedures ... substantive safety is measured by expected crash frequency and severity.” (Hauer 1999a)

The problem with defining safety as a function of compliance with standards, Hauer asserted, is that “Limit standards do not tell the designer what the safest design is. Rather, they specify the limit of what is permissible.” (Hauer 1999b).

Today the Highway Safety Manual (HSM), which is available through AASHTO, is the definitive source of substantive answers to roadway safety questions. The manual was developed and refined by a diverse team of roadway safety stakeholders over the past ten years to provide a single source for safety information and tools in a form that facilitates data-based decision-making.

## **Major effort**

Creation of the HSM began in May 2000 under the direction of a group of volunteers from eight different subcommittees of the Transportation Research Board (TRB) in Washington DC. Research and development for the effort was funded in large part by the National Cooperative Highway Research Program (NCHRP). The Federal Highway Administration (FHWA) provided supplementary funding and research support.

In 2006, a decision was made to publish the HSM as an AASHTO document, at which point a Joint Task Force was formed with representatives from the AASHTO subcommittees on Design, Traffic Engineering and Safety Management. Over the next three years, the task force examined the HSM to ensure that it would meet the needs of State Departments of Transportation and local agencies. During

that time, members of the task force also worked to promote the HSM within their respective subcommittees.

In 2009, after nine years of intensive development and careful refinement, the AASHTO board of directors approved the HSM for distribution.

## **Valuable resource, but not a standard**

Priscilla Tobias, Bureau Chief of Safety Engineering for the Illinois Department of Transportation (IDOT) serves as Chair of the task force that oversees the maintenance and on-going development of the HSM. She is extremely pleased that such a powerful tool is available for road owning agencies. “This manual represents the best safety-related science of our day,” she said. “And it has been thoroughly vetted by safety experts and representatives from all groups involved with roadway safety to make sure it’s accurate and relevant for all stakeholders. This is the first time we have had such a resource.”

Tobias is careful to stress that the HSM is not a standard, like the MUTCD. “The manual is intended as a guide; nothing about it constitutes a legal standard, nor does it mandate responsibilities,” she said. “It’s simply a great tool for making informed decisions about how to allocate resources to address safety issues most effectively.”

## **New direction in highway safety**

The key to the manual’s usefulness lies in its thorough, scientific approach to identifying, analyzing and solving safety problems. First, by accounting for the statistical phenomenon of regression to the mean, many methods of site selection in the HSM help road agencies zero in on the most relevant sites by eliminating from consideration sites that are at a randomly high or low fluctuation in crashes. After a site is identified, the HSM provides a means for analyzing the safety impact of decisions at all stages of the project development process, which enables practitioners to quantify the effectiveness of safety improvements along with other transportation performance measures. Finally, the HSM includes an extensive catalog of proven crash modification factors (CMFs) for a variety of geometric and operational treatment types.



Using CMFs, practitioners can predict the safety impact that a potential treatment or design may have on their road system.

Highway safety expert Dr. Hauer is pleased that the manual is available. "Publication of the Highway Safety Manual indicates wide recognition of the need

for approaching safety in some evidence-based manner. With procedures that examine safety quantitatively rather than subjectively, the document is an important first step in the right direction." ■

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(power grid continued from page 5 )

This will be an interesting experiment to see how dependent our timekeeping is on the power grid, Matsakis said

The North American Electric Reliability Corp. runs the nation's interlocking web of transmission lines and power plants. A June 14 company presentation spelled out the potential effects of the change: East Coast clocks may run as much as 20 minutes fast over a year, but West Coast clocks are only likely to be off by eight minutes. In Texas, it's only an expected speedup of two minutes.

Some parts of the grid, like in the East, tend to run faster than others. Errors add up. If the grid averages just over 60 cycles a second, clocks that rely on the grid will gain 14 seconds per day, according to the company's presentation.

Spokeswoman Kimberly Mielcarek said the company is still discussing the test and gauging reactions to its proposal, and may delay the experiment a bit.

Mielcarek said in an email that the change is about making the grid more reliable and that correcting the frequency for time deviations can cause other unnecessary problems for the grid. She wrote that any problems from the test are only possibilities.

In the future, more use of renewable energy from the sun and wind will mean more variations in frequency on the grid, McClelland said. Solar and wind power can drop off the grid with momentary changes in weather. Correcting those deviations is expensive and requires instant backup power to be always at the ready, he said.

The test makes sense and should not cause too much of a hassle for people, said Jay Apt, a business professor and director of the Electricity Industry Center at Carnegie Mellon University.

But Tom O'Brian, who heads the time and frequency division at the National Institute of Standards and Technology, expects widespread effects.

He said there are alternatives if people have problems from the test: The federal government provides the official time by telephone and on the Internet. No one is quite sure what will be affected. This won't change the clocks in cellphones, GPS or even on computers, and it won't have anything to do with official U.S. time or Internet time.

But wall clocks and those on ovens and coffeemakers — anything that flashes "12:00" when it loses power — may be just a bit off every second, and that error can grow with time.

It's not easy figuring what will run fast and what won't. For example, VCRs or DVRs that get their time from cable systems or the Internet probably won't be affected, but those with clocks tied to the electric current will be off a bit, Matsakis said. ■



# Storm Safety

by Barbara Pratt, GDOT State Risk Manager

All thunderstorms are dangerous and produce lightning. According to FEMA, an average of 300 people are injured and 80 people are killed each year by associated lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms. ***If thunder roars, go indoors***, because there is no safe place outside when lightning is in the area. Everyone should stay indoors for 30 minutes after hearing the last clap of thunder. Here are a few lightning safety tips for inside the home:



- Avoid contact with corded phones, electrical equipment or other cords. If you plan to unplug any electronic equipment, do so well before the storm arrives.
- Avoid contact with plumbing. Do not wash your hands, take a shower, wash dishes or laundry.
- Stay away from windows and doors, and stay off porches.
- Do not lie on concrete floors or lean against concrete walls.

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(continued from page 6)

Body temperature will be near normal. Get the person to a cooler place and have him or her rest in a comfortable position. If the person is fully awake and alert, give half a glass of cool water every 15 minutes. Do not let him or her drink too quickly. Do not give liquids that contain alcohol or caffeine. Remove or loosen tight clothing and apply cool, wet cloths, such as towels or sheets. Call 911 or the local emergency number if the person refuses water, vomits or loses consciousness.

**Heat stroke:** Also known as sunstroke, heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. Signals include hot, red and dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. Body temperature can be very high—sometimes as high as 105 degrees. Heat stroke is a life-threatening situation! Help is needed fast. Call 911 or your local emergency number. Move the person to a cooler place. Quickly cool the body. Immerse victim in a cool bath, or wrap wet sheets around the body and fan it. Watch for signals of breathing problems. Keep the person lying down and continue to cool the body any way you can. If the victim refuses water or is vomiting or there are changes in the level of consciousness, do not give anything to eat or drink.

Be Safe! ■

## LTAP is all online... Are you?

If you are not currently on Georgia LTAP's emailing list to receive training information and the quarterly newsletter, be sure to go online and register.

Are you seeking affordable training for you and your staff? Do you need training that offers real solutions to the real transportation challenges we face in Georgia? If so, please visit our website and review the *Training Opportunities*. For courses that you are interested access the *Registration* link. You can also access past Georgia Roads newsletters that you may have missed.

### LTAP Website:

[www.dot.ga.gov/localgovernment/ltap](http://www.dot.ga.gov/localgovernment/ltap)

Working with Georgia Cities and Counties to Improve Transportation



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## New Manuals Target Local Rural Road Safety

The FHWA Office of Safety has developed three new manuals focusing on reducing crashes on rural roadways owned and maintained by local agencies. The three manuals are Intersection Safety, Roadway Departure Safety, and Roadway Safety Information Analysis. FHWA created these manuals in coordination with the local and rural highway agencies to resolve safety problems on the roads they maintain. The manuals provide the local practitioner with the procedures and processes to improve the safety of local rural roads and to reduce the potential for future crashes.

The manuals can be accessed from the Office of Safety website by the following link  
[http://safety.fhwa.dot.gov/local\\_rural/training/](http://safety.fhwa.dot.gov/local_rural/training/).

For general information on these manuals contact Rosemarie Anderson, [rosemarie.anderson@dot.gov](mailto:rosemarie.anderson@dot.gov).



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